

WHAT IS CLAIMED IS:

1. An informational display unit for a dynamic messaging sign, having at least two display panels that are arranged adjacent each other, each display panel including (i) a rigid front panel having a planar central portion with an array of aperture holes formed therethrough, (ii) a planar sheet lens through which light can pass secured behind the planar central portion, the sheet lens passing over the aperture holes, and (iii) a plurality of pixel display modules located behind the sheet lens, each pixel display module being aligned with one of the aperture holes for selectively displaying an indicator visible from a front of the display panels; the rigid front panels being joined along adjacent sides thereof and arranged with the front panel planar central portions substantially aligned in a common plane.
2. The display unit of claim 1 including an elongate support column having a front portion engaging a front surface of each of the rigid front panels, and a rearward portion extending rearwardly of the front portion between the adjacent sides of the front panels.
3. The display unit of claim 2 wherein, for each display panel, a front surface of the sheet lens engages a back surface of the front panel, and including clamp means secured to the support column for engaging a back surface of the sheet lens of each display panel.
4. The display panel of claim 3 wherein for each display panel, the pixel display modules are mounted on at least one rigid circuit board that is mounted to the clamp means.
5. The display panel of claim 2, wherein the support column has a T-shaped cross-section.
6. The display unit of claim 1 wherein the sheet lens and pixel display modules of each display panel are supported by the front panel thereof.

7. The display unit of claim 1 wherein the rigid front panel of each display panel includes a pair of integral rearwardly projecting sidewalls along opposite side edges of the planar central portion, the display panels having adjacent sidewalls that are secured together.

8. A dynamic messaging sign comprising:

(a) an enclosure having a forward facing opening; and

(b) a plurality of display panels arranged side by side across the forward facing opening, each of the display panels including:

(i) a rigid front panel having a substantially planar central portion with integral rearwardly extending peripheral sidewalls along opposite side edges thereof, the central portion having an array of aperture holes formed therethrough; and

(ii) a plurality of pixel modules arranged rearward of the front panel in alignment with the aperture holes for selectively generating indicators visible through the aperture holes;

the planar central portions being substantially aligned along a common plane with adjacent front panel sidewalls of adjacent display panels being secured together.

9. The sign of claim 8 wherein each of the display panels include a sheet lens through which light can pass, the sheet lens being located between the planar central portion of the front panel and the pixel modules and extending over the aperture holes.

10. The sign of claim 9 wherein for each of the display panels a front surface of the sheet lens is spaced apart from a back surface of the planar central portion.

11. The sign of claim 10 wherein drain openings are provided in a lower portion of the central portion of the rigid panels for draining water from between the sheet lenses and the planar central portions.

12. The sign of claim 9 wherein for each of the display panels, the sheet lens and the pixel modules are supported by the front panel.

13. The sign of claim 9 wherein each of the display panels includes a bracket on each sidewall, edge portions of the sheet lens being clamped between the sidewall brackets and the front panel central portion.
14. The sign of claim 13 where the sidewall brackets extend substantially the entire length of the sidewalls and a water impervious gasket is provided between the clamped edge portions of the sheet lens and the front panel central portion.
15. The sign of claim 9 wherein each display panel includes at least one rigid printed circuit board to which the pixel modules are mounted, the circuit board being spaced rearward of the sheet lens.
16. The sign of claim 15 wherein each display panel includes at least one support member extending between the printed circuit board and the sheet lens, the support member having a first elongate planar member abutting the sheet lens and a second elongate planar member abutting the printed circuit board, the first and second planar members being joined by an elongate intermediate member.
17. The sign of claim 15 wherein the sign includes at least one blower unit arranged to blow air through spaces between the circuit boards and the sheet lenses of the display panels.
18. The sign of claim 8 wherein a water impervious gasket is located between the adjacent sidewalls.
19. The sign of claim 8 wherein the front panels are secured to the enclosure by bolts passing through slots provided through at least one of the enclosure or the front panels, the slots having a horizontal width greater than the bolts such that the horizontal positioning of the bolts in slots can be adjusted.
20. The sign of claim 8 wherein each display panel includes at least one rigid printed circuit board to which the pixel modules are mounted, the circuit board being spaced rearward of the central planar portion, each pixel module having a forwardly

extending shroud on which is mounted a lens cap having a lens section through which light from the pixel module can pass.

21. The sign of claim 8 including a plurality of spaced apart support members extending across the forward facing opening and secured to the enclosure, and a plurality of clamps clamping the front panels to the spaced apart support members, at least some of the clamps having a front portion for simultaneously engaging the front panels of a pair of adjacent display panels and a rearward portion for engaging one of the support members.

22. The sign of claim 21 wherein each display panel includes a planar sheet lens through which light can pass, the sheet lens being located between the planar central portion of the front panel and the pixel modules and extending over the aperture holes.

23. The sign of claim 22 wherein the sheet lens is secured to the front panel by adhesive.

24. The sign of claim 22 wherein for at least some of the display panels, a forward surface of the sheet lens engages a rearward surface of the planar central portion of the front panel, the sheet lens having elongate side edge portions adjacent the sidewalls of the front panel with elongate resilient gaskets being clamped rearward of the elongate side edge portions.

25. The sign of claim 21 wherein, for the at least some of the clamps, the front portions of the clamps are movable between a position in which the front portion engages simultaneously the front panels of the pair of adjacent display panels, a second position in which the front portion engages a first one but not a second one of the adjacent front panels, and a third position in which the front portion engages the second one but not the first one of the adjacent front panels.

26. The sign of claim 21 including rigid circuit boards to which the pixel modules are mounted, the circuit boards being spaced rearward of the central planar portions

of the rigid front panels, defining air gaps there between, the circuit boards being mounted to the enclosure independently of the front panels.

27. The sign of claim 26 wherein the enclosure includes an enlarged portion adjacent the forward facing opening, the enlarged portion housing a fan unit for directing air into the air gaps.

28. The sign of claim 26 wherein the enclosure includes a support member, each of the front panels including a connecting member slidably engaging the support member such that the front panel is slidable in a first direction away from the pixel modules located therebehind, and in a second direction along the support member lateral to the first direction to expose the pixel modules to access through the forward facing opening.

29. A dynamic messaging sign comprising:

(a) an enclosure having a forward facing opening;

(b) a plurality of spaced apart, substantially parallel, elongate support columns connected to the enclosure and extending across the forward facing opening;

(b) a plurality of display panels arranged side by side across the forward facing opening, each of the display panels including:

(i) a substantially planar rigid front panel having an array of aperture holes formed therethrough; and

(ii) a plurality of pixel modules arranged rearward of the front panel in alignment with the aperture holes for selectively generating indicators visible through the aperture holes,

the front panels being substantially aligned along a common plane, the support column being located between side-edges of the front panels of adjacent display panels.

30. The sign of claim 29 wherein each support column includes a front portion engaging a forward facing surface of each of the front panels that the support column is located between.

31. The sign of claim 30, each display panel further including a sheet lens through which light can pass, the sheet lens being located between the front panel and the pixel modules and extending over the aperture holes. wherein, for each display panel, a front surface of the sheet lens engages a back surface of the front panel, and including clamp means secured to the support column for engaging a back surface of the sheet lens of each display panel.

32. The sign of claim 31 wherein for each display panel, the pixel display modules are mounted on at least one rigid circuit board that is mounted to the clamp means.

33. The sign of claim 30 wherein each display panel includes at least one rigid printed circuit board to which the pixel modules are mounted, the circuit board being spaced rearward of the front panel, each pixel module having a forwardly extending shroud on which is mounted a lens cap having a lens section through which light from the pixel module can pass.

34. The sign of claim 30, wherein the support column has a T-shaped cross-section.

35. A dynamic messaging sign comprising:

(a) an enclosure having a forward facing opening;

(b) a plurality of rigid front panels having an array of aperture holes therethrough, the front panels being arranged side-by-side across the forward facing opening;

(c) a plurality of circuit boards mounted to the enclosure rearward of the front panels, the circuit boards having pixel modules arranged thereon in alignment with the aperture holes for selectively generating indicators visible through the apertures from a viewing direction forward of the sign, the circuit boards being spaced apart from the front panels to define air gaps therebetween; and

(d) at least one fan located in the enclosure for directing air into the air gaps between the front panels and the circuit boards.

36. The messaging sign of claim 35 wherein the enclosure includes a compartment in which the fan is housed, the compartment having an outlet that is substantially exclusively in communication with the air gaps.